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DINOSAUR CONSTRUCTION KIT

TYRANNOSAURUS REX

EXPLORE-A-SCIENCE

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For Apple IIe/IIc/IIgs with 128K
15077-0

D.C. Heath Software

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TYRANNOSAURUS REX

STUDENT DISK

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DISKETTE CARE AND HANDLING INFORMATION

Protect
Protéger
保護

Proteger
Schützen

No
Non
注意

No
Falsch

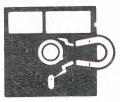
Insert Carefully
Inserer avec soin
插入注意

Insertar
Sorgfältig Einsetzen

Never
Jamais
絶対禁止

Nunca
Nie

10°C–52°C
50°F–125°F



Never
Jamais
絶対禁止

Nunca
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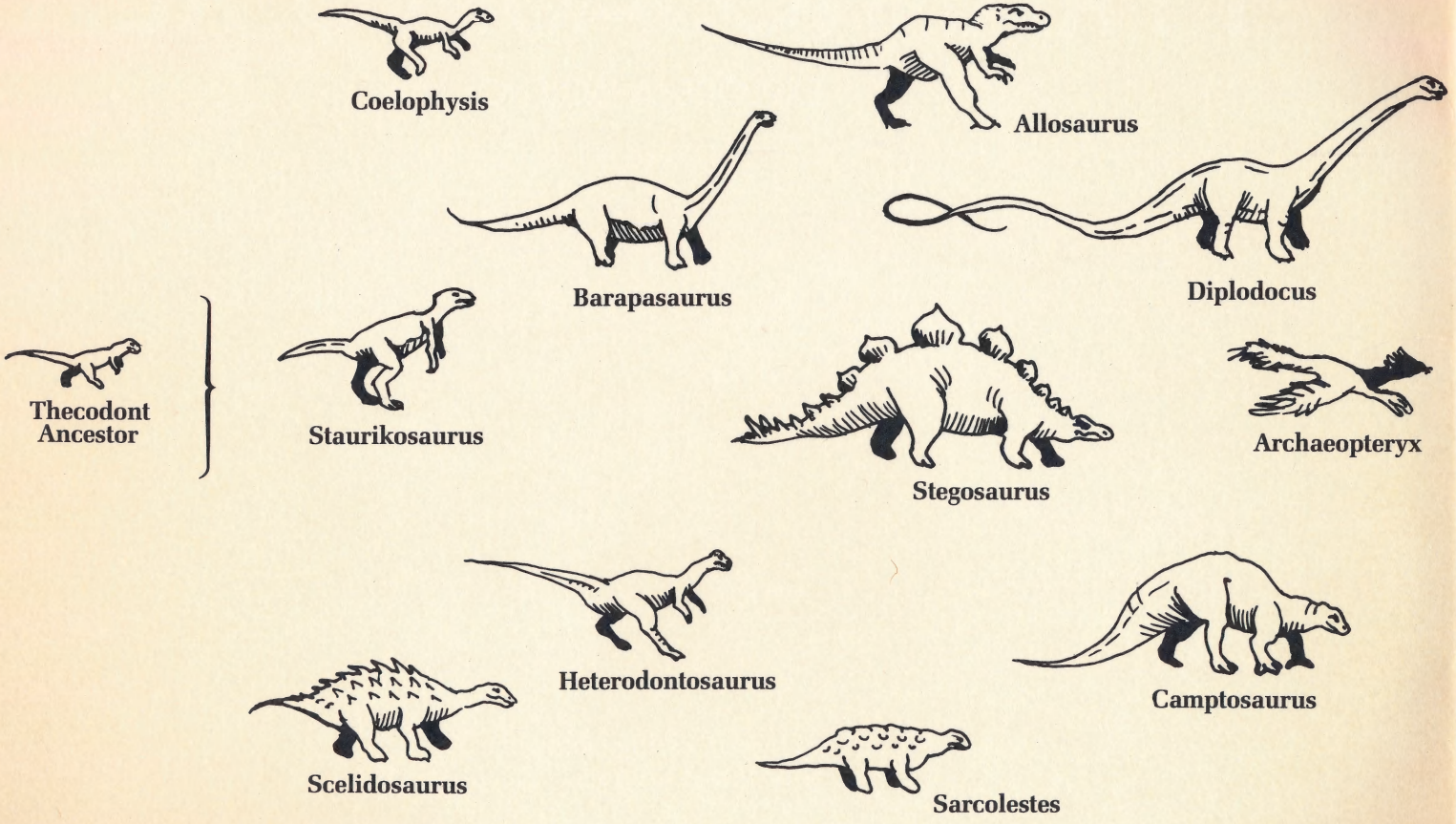
THE AGE OF DINOSAURS

.... TRIASSIC ..... JURASSIC .....



..... MILLIONS OF YEARS AGO .....

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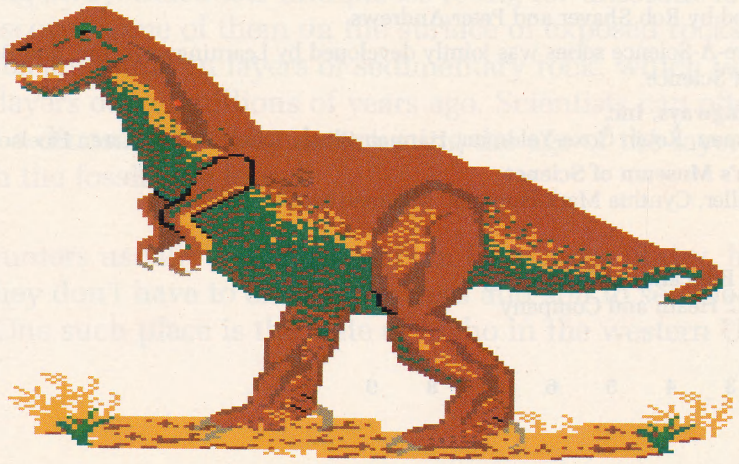
DINOSAUR CONSTRUCTION KIT

TYRANNOSAURUS REX

EXPLORE-A-SCIENCE



Written by Art Bardige and Henry Olds
Illustrated by Angela Faeth

The art appearing in this book was generated
with the Explore-A-Science Software.

PALOS VERDES PENINSULA UNIFIED SCHOOL DISTRICT

Programmed by Rob Shaver and Peter Andrews

The Explore-A-Science series was jointly developed by Learningways, Inc. and Boston's Museum of Science.

For Learningways, Inc.
Sam Wantman, Robin Coxe-Yeldman, Hannah Bloch, Laura Koller, Karen Hoelscher

For Boston's Museum of Science
Inabeth Miller, Cynthia Mark-Hummel, Maureen McConnell

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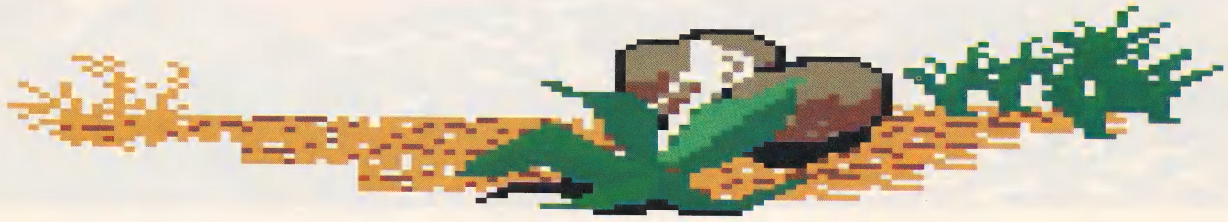
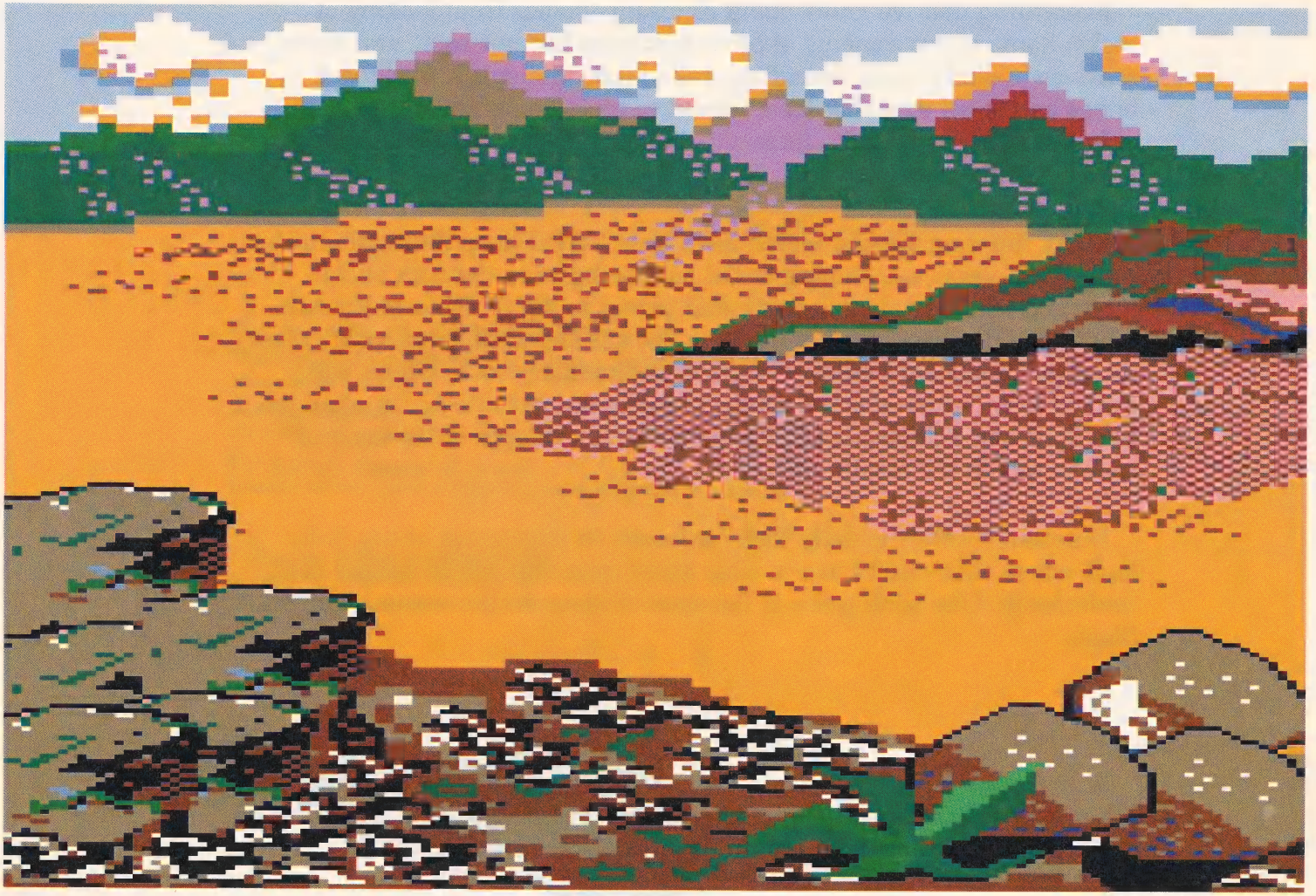
1 2 3 4 5 6 7 8 9 0

Everything that we know about dinosaurs comes from looking at rocks. Some of the remains of dinosaurs have become rock, and these rocks are called fossils. Scientists, called paleontologists, find fossil bones and fossil eggs that have turned to rock. Sometimes, they find only the impressions of a dinosaur's bones in rock. Even the mud in which the dinosaurs left their footprints is found as rock.

Many dinosaur fossils, which have been buried deep underground for millions of years, are coming to the surface because the rock above them is eroding away. Scientists find places to dig for dinosaur fossils when they discover some of them on the surface of exposed rocks. Most dinosaur fossils are found in layers of sedimentary rock, which was formed from layers of soil millions of years ago. Scientists can often tell how long ago a dinosaur lived by determining the age of the layer of rock in which the fossils are found.

Dinosaur hunters usually look for fossils in large areas of dry, hilly land where they don't have to clear away trees and soil to see the rock underneath. One such place is the state of Idaho in the western United States.





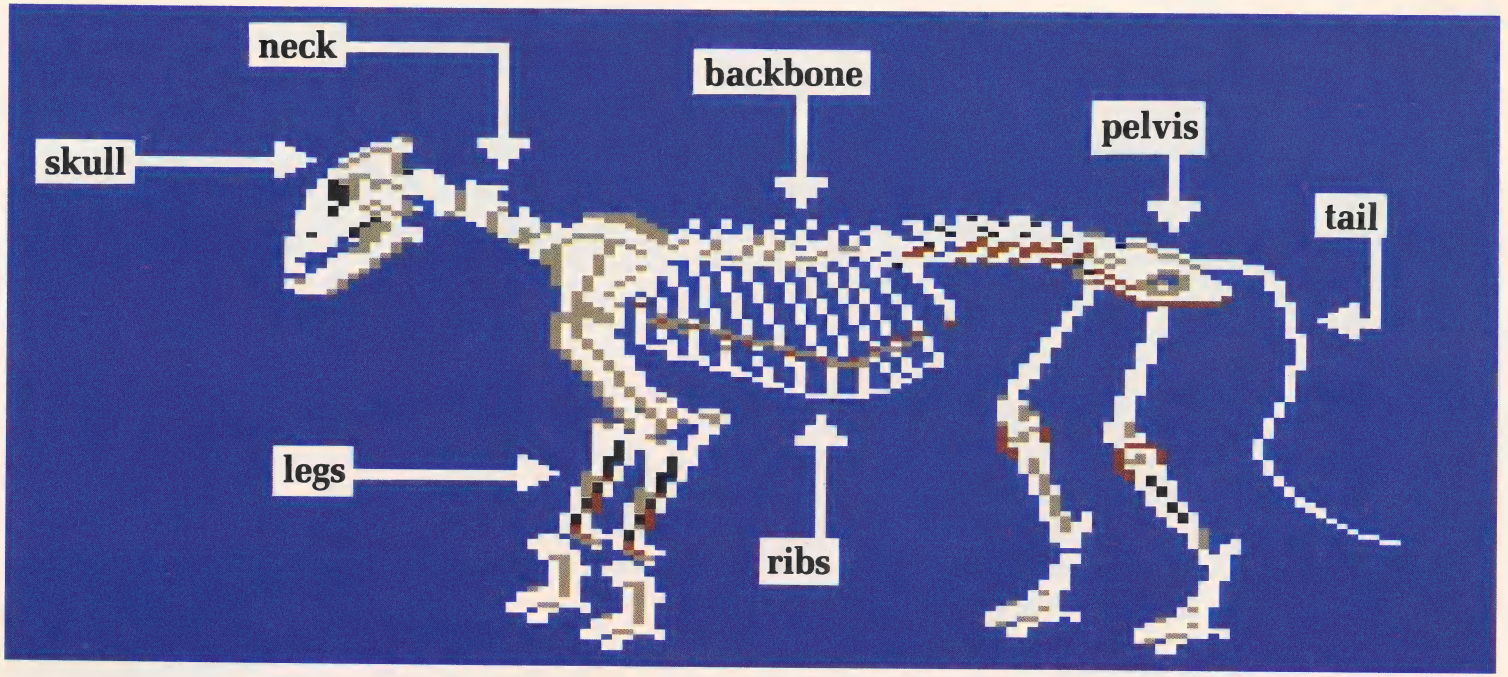
Find and pick up the dinosaur fossil in the Idaho scene (Scene 1) on your disk.

As you explore, you can make field notes on your disk by selecting the ***FIELD NOTES*** *file, where you will find two pages started. Each time you write, save your notes under your own name. Make a new page of notes any time by clearing the screen and selecting a blue or white background. Return to the dinosaur scenes by selecting the* ***T REX*** *file.*

The work of scientists would be very easy if they could find all the fossil bones of a dinosaur in one place and joined together so that they looked just like a dinosaur skeleton. This does not happen very often. Most of the time, scientists find only a few scattered fossils and have to recreate the entire animal from these few odd parts.

Imagine trying to put together a jigsaw puzzle with many of the pieces missing, and with no picture to show you the finished scene. You might try to figure out where the pieces belonged by imagining the picture and drawing it to help you complete the puzzle. Scientists also draw a picture to help them build a dinosaur skeleton.

Your puzzle would be much harder if the pieces did not all belong to the same scene. Scientists who put together a dinosaur skeleton frequently face this more difficult problem as they attempt to separate the fossils of one dinosaur from those of another.

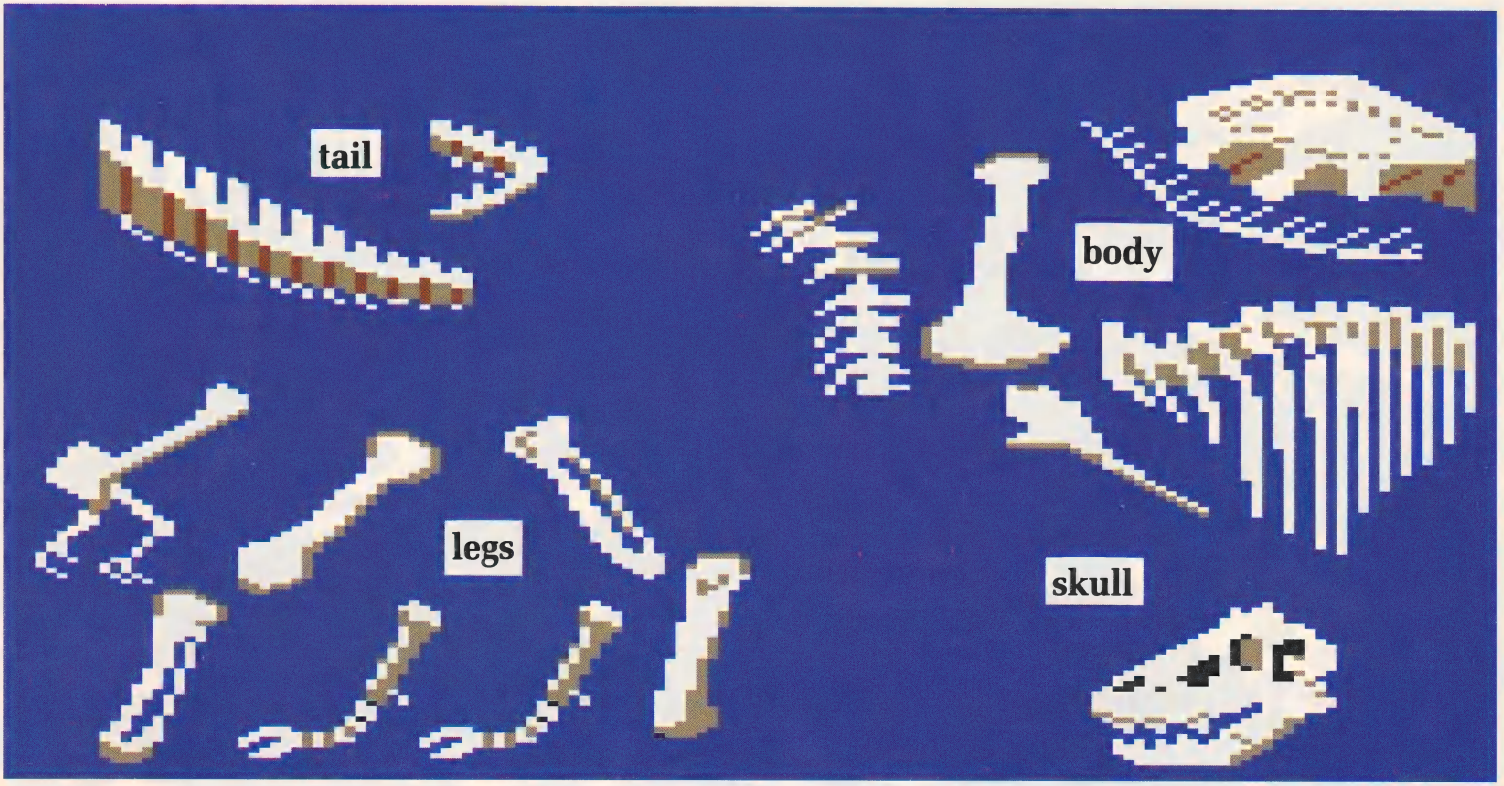


How do scientists solve fossil puzzles?

They begin by observing the skeletons of living animals, such as a lion. They believe that dinosaurs had similar body parts and a similar body design.

Look at the labeled skeleton of the lion on this page. Compare the bones in its skeleton to those of *Tyrannosaurus rex* on the next page.

You can explore a lion skeleton by selecting the file called LION.



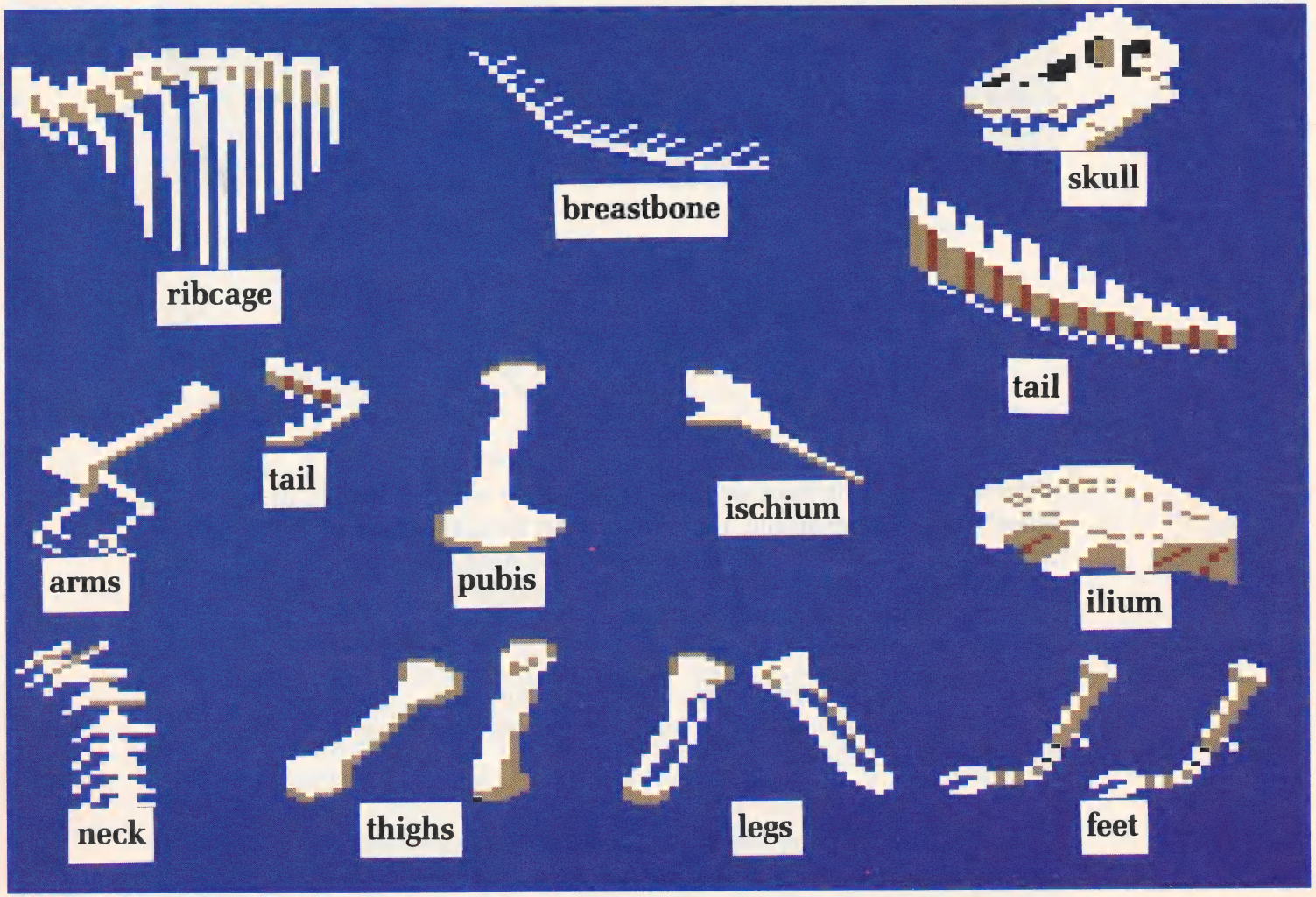
Dinosaurs were vertebrates . . . that is, they had backbones. Like most vertebrates, a dinosaur had a head, a neck, a ribcage, a pelvis, two arms, two legs, and a tail. Some had long necks like a giraffe. Some had small front legs and long hind legs, like a kangaroo. Others had front legs that were as long as their hind legs, like a horse. But, in general, their bodies had the same kinds of bones, arranged in about the same way.

Turn to Scene 2 on your disk. This is the first dig site. Find the fossil bones of T. rex

On this expedition, most of the bones of a T. rex skeleton were found at two sites. Those that were not found had to be made from plaster to look like the missing bones.

Before scientists build a skeleton, they sort the bones and bone fragments they have collected into groups of body parts. Putting the bones in groups helps them keep track of which bones to use as they build the skeleton.

Turn to Scene 3. Sort the T. rex bones into four groups of body parts.


ribcage
breastbone
skull
tail
arms
tail
pubis
ischium
ilium
neck
thighs
legs
feet

Turn to Scene 4. Put the bones together to make a skeleton of T. rex.

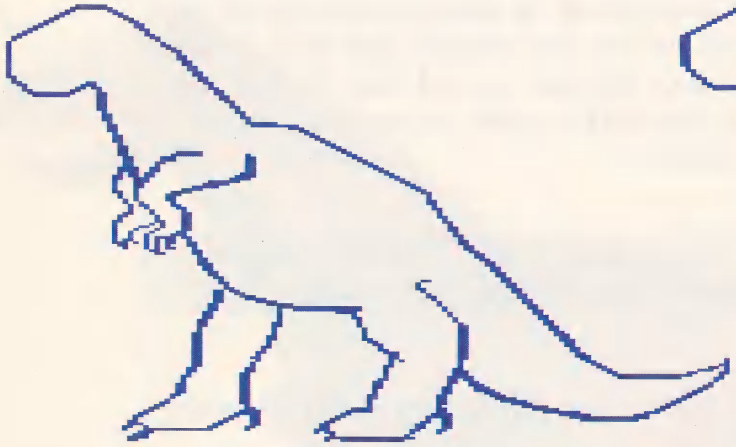
You might try drawing an outline of T. rex on paper to guide you. If you need help, you can see a rough outline of T. rex by selecting a blue ***Background*** *for Scene 4.*

As scientists put together fossil bones, they work carefully, in an orderly way. For example, they might start from the head of T. rex and work back toward her tail. They would constantly compare her constructed skeleton with their outline drawings of T. rex and with skeletons of other animals.

Scientists ask questions like, "Are these leg bones large enough to support such a large body?" If not, they suspect they may have found the wrong leg bones.

You can see the complete T. rex skeleton on page 14. You can explore a T. rex skeleton and see all the labeled bones by selecting the disk file called BONES. Before you leave Scene 4, be sure to save your work under your own name if you have not finished it.

Outline of old version of T. rex



Outline of new version of T. rex

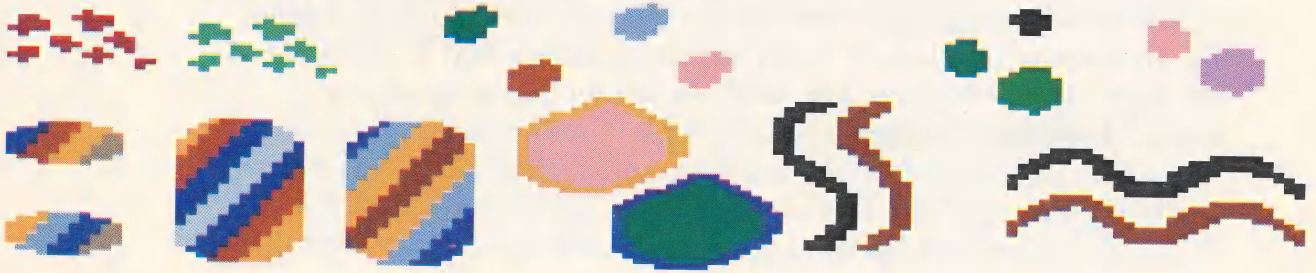
Scientists do make mistakes when they are working with incomplete information. They frequently have to change their ideas as they learn more. Here are two outlines of T. rex. The first shows her the way that scientists before 1960 thought she looked. The second shows her the way today's scientists think she looked. The 1960 T. rex would have walked slowly, dragging her tail on the ground. She would have acted like an alligator or a lizard. Today scientists believe that T. rex was fast and agile, like a kangaroo. She used her tail for balance and as a weapon to swing at enemies.

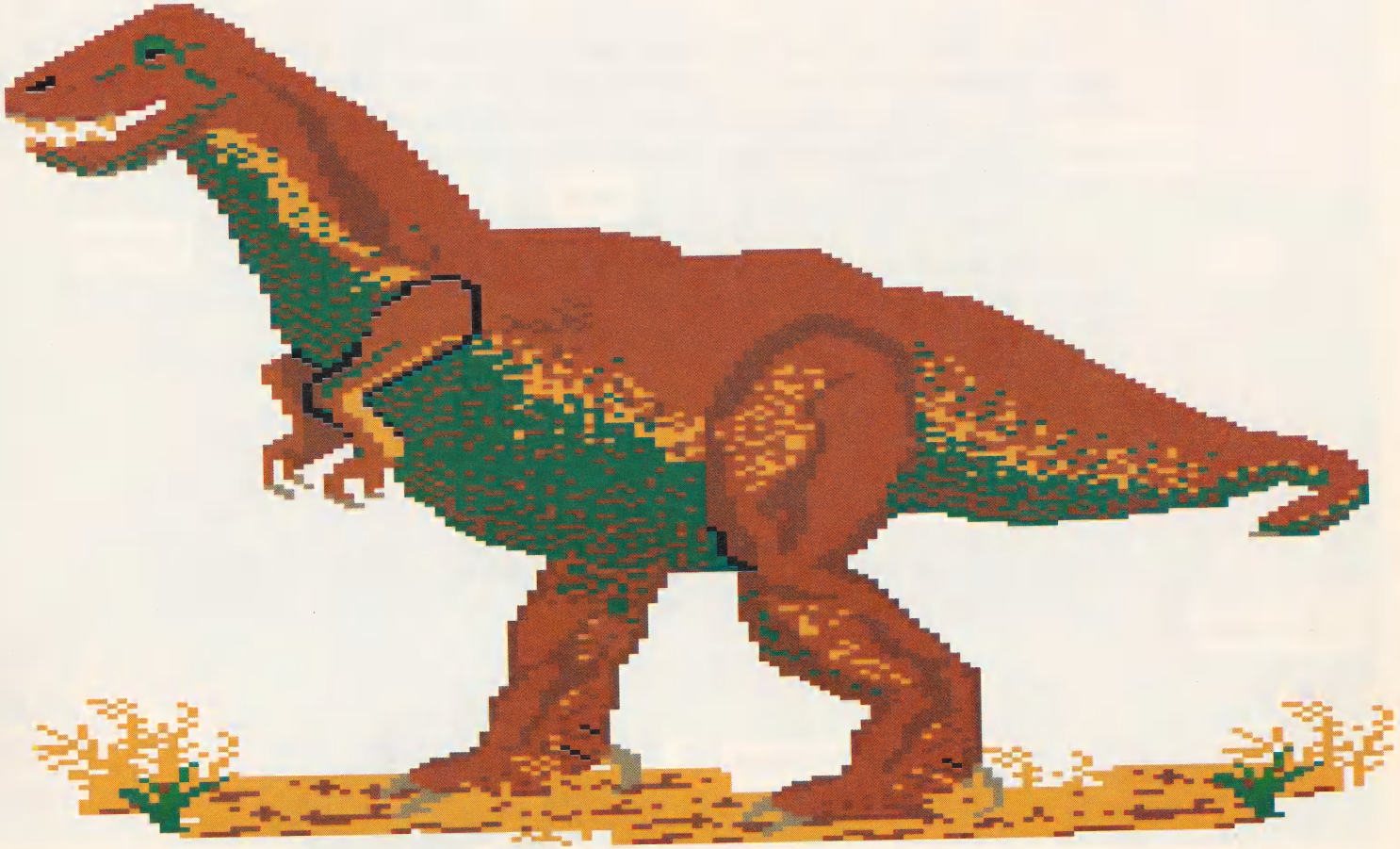
No one has seen a living T. rex. She became extinct 65 million years ago. Therefore, no one knows how her body really looked on her skeleton. For scientists, creating a body for T. rex is just another puzzle. They can get an idea of how it would look by again comparing her to similar living animals. They look at how the muscles and flesh and skin fit on living animals and then guess that they would have fit in a similar way on T. rex. Sometimes they can tell by marks on her bones where her muscles and tendons were attached.

Turn to Scene 5. This is one idea of what T. rex might have looked like. Remove the skin pieces to see her skeleton underneath.

Scientists also don't know T. rex's color, the pattern of her spots or stripes, and the feeling of her skin.

Turn to Scene 6. You can color the body of T. rex using the patterns and shapes below.





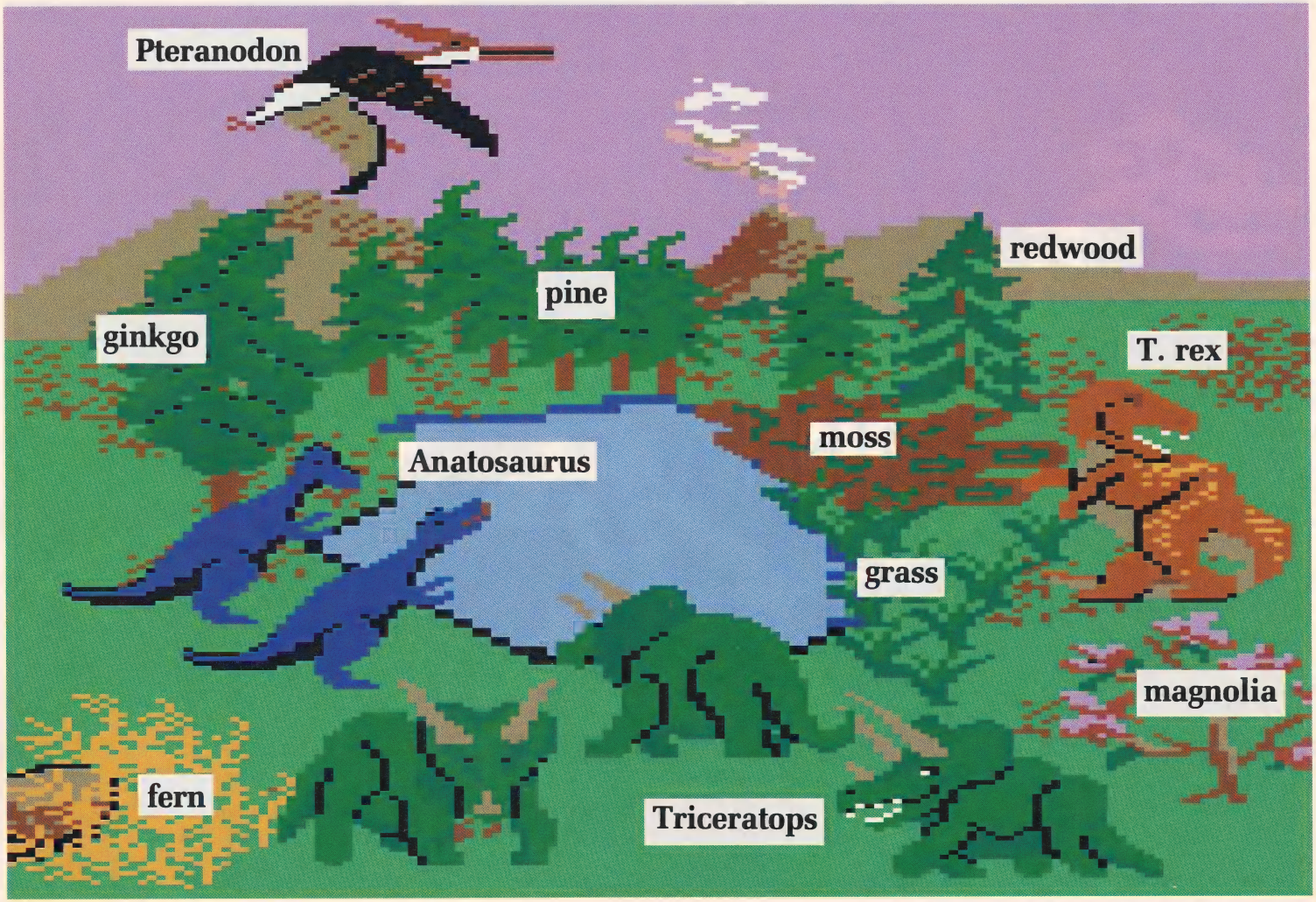
Turn to Scene 7. Explore moving T. rex around her world. Note how she compares in size to the things around her.

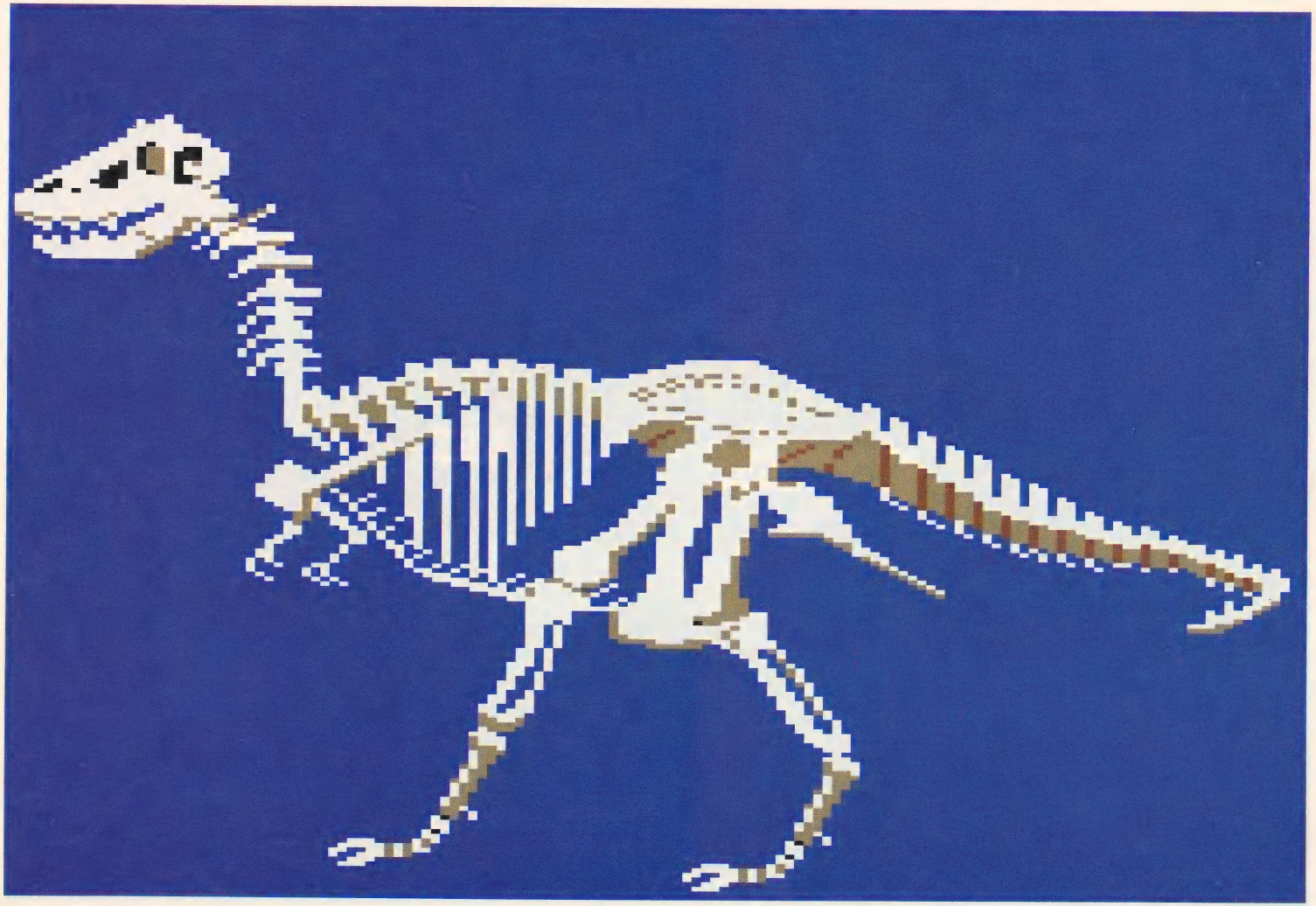
T. rex lived during the Cretaceous period, the last of the dinosaur ages. She may have been the greatest carnivore . . . meat eater . . . of that time. Only five fossil skeletons of T. rex have been found in the entire world. Maybe someday scientists will discover an even larger prehistoric carnivore.

The world of T. rex had trees, flowers, and bushes that we would recognize. It had forests and swamps. Because the climate was much like today's, we would be comfortable there.

No one knows why T. rex and her Cretaceous cousins did not survive. Some scientists believe their food supply died out when the climate changed.

On the timeline at the beginning and end of the book, you can find the Cretaceous period when T. rex lived.


Pteranodon
redwood
pine
ginkgo
T. rex
moss
Anatosaurus
grass
magnolia
fern
Triceratops



THE AGE OF DINOSAURS

CRETACEOUS

Deinonychus

Tyrannosaurus

Ornithomimus

Apatosaurus

Pteranodon

Titanosaurus

Paranthodon

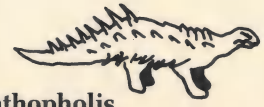
Dravidosaurus

Triceratops

Psittacosaurus

Anatosaurus

Pachycephalosaurus



Acanthopholis

Ankylosaurus

MILLIONS OF YEARS AGO

135 100 65

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AUTHOR
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TITLE
guide, 1 prog. disk, 1 stud. disk

DATE DUE	BORROWER'S NAME	ROOM SCHOOL
6/15/90	G. Snider	VG

GAYLORD 65

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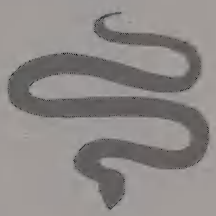
TYRANNOSAURUS REX

TEACHER'S GUIDE



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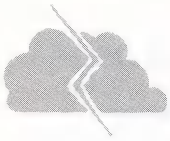

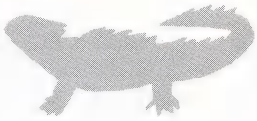

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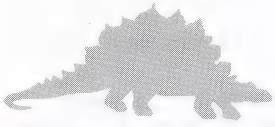
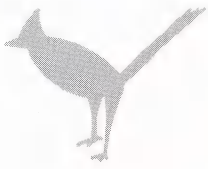
TYRANNOSAURUS REX

TEACHER'S GUIDE





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The *Dinosaur Construction Kit - Tyrannosaurus rex,* from the EXPLORE-A-SCIENCE collection, was developed and produced by Learningways, Inc., Boston's Museum of Science, and Collamore Educational Publishing.

Collamore Educational Publishing
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Lexington, Massachusetts 02173

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Published simultaneously in Canada
Printed in the United States of America
International Standard Book Number: 0-669-14945-4

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Introduction

Explore-A-Series are integrated educational programs that help students discover reading, writing, and their own imaginations. While using Explore-A-Series, the reader can become the writer, changing and rearranging the existing story, or starting a new one from scratch. Additionally, students' stories can be saved to disk or printed and made into books.

There is a variety of ways to use Explore-A-Series. The following is a basic sequence to guide your use of these programs.

- Reading the books written by children's authors.
- Paging through the scenes on the computer screen.
- Changing and experimenting with existing scenes, using the computer.
- Creating and printing original stories from the new scenes.

As you will soon discover, the uses of Explore-A-Series are as limitless as the imaginations of your students.

Getting Started

Explore-A-Series is as easy to use as putting the Program Disk into the disk drive and turning on the computer. Changing scenes, moving characters, saving files, printing stories, and most other functions are controlled with an on-screen "pointer" and Menu Bar.

Your Explore-A-Series package includes five books, this Teacher's Guide, and four disks: the Program Disk, the Student Disk, and two back-up disks.

A short time with this guide and the Student Disk should be enough for you to master Explore-A-Series. For the student, one session should be enough to read the story and page through the computer scenes. During the next session, you will need to guide the student through the Menu Bar and its functions.

An Apple IIe (with 128K of memory), IIc, or IIGS computer and one disk drive can be used. You can use a color or black-and-white printer (optional). A color monitor is preferred.

Loading the Program

Put the Program Disk into the disk drive, close the drive door, and turn on the computer. This will load the program.

After the Program Disk is loaded, you will be prompted to insert the Student Disk and click on the blue box in the upper-right corner of the screen. If you are unfamiliar with the term "click," see the following section, "Moving the Pointer."

A back-up of each disk is included and should be kept in a safe place. In the classroom, you will need just one Program disk and enough Student Disks for each computer. Although copies of the Program Disk cannot be made, you can make as many copies of the Student Disk as desired. Student Disks can be copied with the Apple System Master disk that came with your computer.

Moving the Pointer

Most of the functions in Explore-A-Series are controlled with an on-screen "pointer." After loading, you will see the story title screen. There will be a small arrow on the screen. This is the "pointer."

To move the pointer, you can use a mouse, a joystick, a Koala Pad, or the keyboard. The following is a brief description of how to move the pointer using each of these pieces of equipment.

Mouse: Any movement of the mouse will affect the pointer location. Move the pointer to the desired location by moving the mouse along a flat surface.

Joystick or **Koala Pad:** Movement of the joystick or a finger across the Koala Pad will cause the pointer to move in that direction.

Keyboard: Pressing the arrow keys on the keyboard will slowly move the pointer. (The ↑ moves the pointer up, the → moves the pointer to the right, etc.) For faster movement, hold down the [apple] and an arrow key at the same time.

To "click" with the

Mouse: press the button.

Joystick: press the fire button. (If your joystick has two buttons, experiment to see which button is active.)

Koala Pad: press one of the two front buttons.

Keyboard: press the [apple]

At this point, you may want to try moving some things on the screen. Put the pointer on an object or a character. Click once to pick it up. Move it to another place on the screen. Click again to drop it. (You will notice some things cannot be picked up. They are part of the background.)

Turning Pages on the Screen

The "pages" on the screen can be turned by using the Page Turner. The Page Turner is the blue box located in the upper-right corner of the screen. There is always a number on the Page Turner box, indicating which page in the story is on the screen. You will also note the arrow pointing to the right, which always appears next to the page number.

Clicking on the Page Turner box will advance the story pages sequentially. After you have reached the end of the story, the title page will again appear, allowing you to reread the story, if desired.

Writing in the Scenes

You can add your own text to the story by positioning the pointer where you wish the text to begin. Then start typing the desired text, pressing RETURN each time you want to move to the next line. To edit or delete your writing, follow the directions under **Labels** in the Menu Bar section.

The Menu Bar

The Menu Bar displays the characters, objects, backgrounds, labels, disk functions, and printing options available to the user. The Menu Bar is revealed by clicking on the green box in the upper-left corner of the screen. (Pressing the ESC key is an alternate way to reveal the Menu Bar.) When the Menu Bar is visible, you will notice that the box in the left-hand corner contains a red "X." Click again on the box, or anywhere not on the Menu Bar, and the Menu Bar will disappear.

Each picture box or "icon," represents a specific function you can perform.

Characters Allows you to add animated characters to your scene.

Objects Allows you to add objects to your scene.

Backgrounds Allows you to change the scenery or background.

Labels — Allows you to place prewritten words in your scene.

Disk Functions — Allows you to load new files, save scenes, clear the screen, and access **Set Up** and **Disk Utilities.**

Print — Allows you to print existing or new scenes in black-and-white or color.

Characters

Move to the first box in the Menu Bar and click. A catalog of animated characters will appear below it. You can flip through them by clicking on the ↓ and ↑ arrows. To select one, click directly on the character and move it into the scene, then click again; it will remain in that spot.

To delete a character, click on it, move it off the screen, and click again. Or, while carrying the character, press DELETE.

Objects

Move the pointer to the second box on the Menu Bar and click. A catalog of available objects will be displayed. To flip through the selections, follow the same procedure as with characters. To select, click directly on the object and move it into the scene. To drop, click again.

As with characters, the objects can be deleted by running them off the screen and clicking, or by pressing DELETE while carrying. **Note:** Some objects are part of the background and cannot be moved.

You can copy the object you are carrying by pressing SPACE when the object is over a desired spot. About 200 copies of the object can be placed in the scene.

Backgrounds

Backgrounds are selected from the third box in the Menu Bar. A background may be changed on an existing scene. The choices available for the scene are displayed and accessed in the same way as characters and objects. To create an entirely new scene, you must first clear the screen (see **Disk Functions - Clear Screen**) and then select a new background.

Labels

This is a collection of words that can be used as labels for the characters and objects in the story. Add them to a scene in the same way as characters and objects.

Deleting labels or text:

1. Click on the word or group of words you want to change or delete.
2. Press DELETE to begin erasing at the last letter of the line.
3. Continue to press DELETE to remove unwanted letters or words.

Disk Functions

The Disk Functions are:

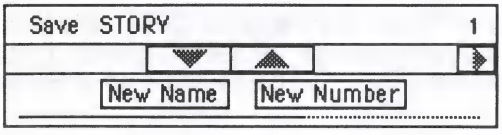
- **Open** - Loads files from the disk in the drive.
- **Save** - Saves new scenes or scene changes on the Student Disk. (Be sure the Student Disk is in the drive.)
- **Clear Screen** - Erases scenes from the monitor.
- **Setup** and **Disk Utilities** - (See **Teacher Utilities**).

Open

To open or load a scene on the Student Disk, click on **Disk**, then **Open**. Then click on either arrow to see the names of the scenes.

Clicking on the name box will load the page indicated by the number shown in the box. If another page is desired, click on the ▶ below the number until the desired page is displayed beside the title. Then click on the name box.

Save



To save a newly created or modified scene, select **Disk**, then **Save**. If a scene will not save, it has been "locked" previously (See **Disk Utilities**). Remember to save your scenes on a Student Disk.

Each time you save the first scene of a new story, you must choose a new story name. After a story has a name, then each scene in the story must be given a new number.

Caution: Save any scene you have created before going on to a new scene, or it will be lost.

The red line under **New Name - New Number** shows how much disk space has been used. When the red line comes close to the right edge, the disk is nearly full. If the disk is full, delete unwanted scenes or use another Student Disk.

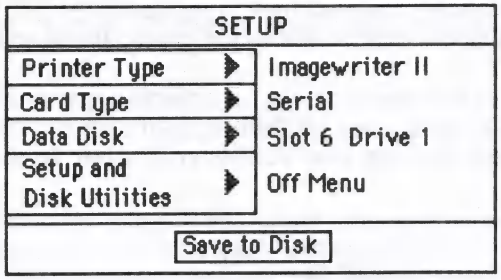
Clear Screen

To erase everything on the screen, choose **Disk** from the Menu Bar, then click on **Clear Screen. Caution:** If you clear the screen without first saving any newly created scenes, your work will be lost.

Teacher Utilities

The following utilities (**Setup** and **Disk Utilities**) are functions not ordinarily used by students, and for that reason are not readily accessible. To use these functions, choose **Disk**, then press and hold CTRL and T .

Setup



The default settings for Explore-A-Series are:

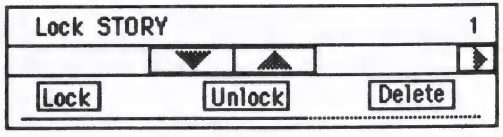
- Apple Imagewriter II printer
- Serial printer card
- One disk drive

To change these settings, click on **Disk**, press and hold CTRL and T, then click on **Setup**. With the pointer, select the option you want to change and click on it. Notice the default has changed.

If you would like to have these teacher utilities visible in the **Disk** menu box, click on **Setup and Disk Utilities** to change the default to **On Menu**.

To save this new setup, make sure the Program Disk is in drive 1, then click on **Save to Disk.**

Disk Utilities



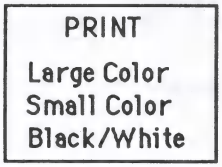
Any scene may be locked, unlocked, or deleted.

Locking: To lock a scene, click on **Lock,** then the name. (An asterisk in the name box indicates that the file is locked.)

Unlocking: Unlocking a scene makes it possible to delete, resave, or replace a scene. Click on **Unlock**, then click on the name.

Deleting: This function removes an unlocked scene permanently from the disk. First, click on **Delete**, then click on the name box. **Be sure this is the scene you wish to delete.**

Print



Any scene in Explore-A-Series can be printed in color or black-and-white. Before printing, make sure the setup is correct for printer/computer combinations in the **Disk Functions-Setup** section.

Two image sizes can be selected for color printing. Black-and-white images are printed in outline and students can easily color them in.

EXPLORE-A-SERIES in the Classroom

Overview

There are many approaches to using Explore-A-Series. This section provides ideas and suggestions for using the *Dinosaur Construction Kit - Tyrannosaurus rex* in the classroom. As you read through this section, think of your own classroom setting and the way in which you might best use the kit to build your students' skills in reading, writing, and scientific discovery.

Teacher Preparation

Before using the *Dinosaur Construction Kit - Tyrannosaurus rex* with your class, you should become familiar with how the program works - opening the Student Disk, paging through the scenes, saving new scenes, and printing pages.

When the program is introduced to the class, each computer should be loaded with the Program Disk, then the Program Disk should be removed. A Student Disk should then be inserted in the drive of each computer.

Suggested Lessons

You may wish to present *Tyrannosaurus rex* to your class using the following lessons found in the **CLASS** file of the Student Disk.

1. Building a Lion Skeleton

This activity uses page 1 of the **CLASS** file.

After the students have opened page 1 of this file, tell them that it is likely that there are some bones in this location.

Ask the students to:

a) uncover the bones
b) decide what animal most of the bones come from (a lion)
c) discard (delete) the two *T. rex* bones that do not belong
d) construct the lion
e) add whatever bones are needed (from the Objects catalog) to finish the skeleton.

Remind the students that they can look at the lion skeleton in their book, or they can look at the fully constructed lion skeleton on the disk in the **LION** file. If the students need more help, they can find a rough outline of the lion skeleton on page 1 of the **CLASS** file by selecting a light blue background for the page.

2. Seeing Differences

This activity uses pages 2 and 3 of the **CLASS** file.

Professor Filder has sent the museum a box of bones, carefully wrapped in pink packing material.

After opening page 2,

a) Ask the students to sort and classify the bones by

1. unpacking the bones
2. comparing the bones found there with the *T. rex* bones found on page 7 of the science reader
3. saving the bones that are from *T. rex*
4. discarding (deleting) the bones that are not from *T. rex.*

Then, on a separate piece of paper, have the students make notes and drawings of the missing bones.

Then, on page 3,

b) Ask the students to insert their name and the name of the school on the letter head, then document their findings by

1. writing a note to Prof. Filder telling him which bones were missing.
2. pulling bones from the Object catalog that would complete the skeleton, and labeling them on the report to the Professor.

When students finally type their findings on page 3 of **CLASS**, they may find they'll need more room. In that case, have them save the first page of their report under their own name, then start a new one by clearing the screen and selecting a light blue background.

Remember to save any additional screens with the students' name and a new page number. The report can then be printed.

3. Creating New Stories

This activity uses the file called **Story Starter.**

Page 1 of the Story Starter file shows an empty plain skirted with mountains.

How might this prehistoric scene have looked near the end of the Age of Dinosaurs? Have the students fill in the scene with dinosaurs and other objects pulled from the Menu Bar that illustrate their ideas.

Then, on page 2 of the Story Starter, have them write some of their own conclusions about why dinosaurs disappeared.

Some possible scenes and stories are:

1) Scene: Volcanoes erupting, dinosaurs scurrying on barren land.
Conclusions: "The volcanic eruptions filled the air with ash, blocking the sunlight. The earth cooled so much that the plants could no longer survive. Without food, the dinosaurs died."

2) Scene: A great many dinosaurs crowded around the pond.
Conclusions: "The dinosaurs became so numerous that there was no longer enough food to go around. Eventually, there was so little left to eat that the dinosaurs died."

Additional Activities

You may wish to try the additional classroom activities with your students.

- **Classifications**: Scientists are frequently called upon to sort and classify the things they discover. Often it is not an easy task.

  Bring in a box full of buttons, bolts, nuts, screws, and washers. Then spread out the contents of the box on a desk and ask the students to sort and classify the contents.

  Encourage the students to give a title to each category of objects. Some classifications will be simple and obvious. Others may require considerable discussion before an agreement can be reached.

- **Building Skeletons:** Students enjoy putting together real skeletons. The easiest kind of bones to use are chicken or turkey bones.

  Save the bones from a whole cooked chicken or turkey. Boil them until they can be scraped clean (don't boil too long), then put the bones on a cookie sheet and dry them in a warm oven.

  Have the students arrange the bones on a flat surface, labeling the large bones, or have them arrange them within an outline of a turkey or a chicken.

  Discuss the differences and similarities between these bones and those of a lion or a dinosaur.

- **Discovery:** Let the students become classroom archaeologists. Cover the bottom of a box with a few inches of sand, then place pieces of the chicken or turkey bones around the box as they might be found buried under layers of dirt. Then, completely cover the bones with sand. Have the students "go on a dig" with spoons and dry paint brushes, assembling the bones in order on a large piece of cardboard.

  You may want to mix up the bones with one or two bones from another animal to see if the students can discover the differences.

  Instead of bones, pieces of a puzzle or parts of a broken doll could be used.

- **Other Dinosaurs:** Have students do a library research project. Have them pick another dinosaur that lived during the Cretaceous period and prepare a short report on that dinosaur for the class. (They could select one of the dinosaurs from the back page of the *T. rex* science reader.)

  If possible, students should try to find a picture of the skeleton of their dinosaur so that it can be compared with the skeleton of *T. rex.*

- **What If's:** Ask the students to imagine finding Tyrannosaurus rex in their backyard. What is she eating? How is she eating it, with her hands? What kind of noise does she make? Have them act out the motions and the noises of T. rex. Do they think they could fit her in their bedrooms?

- **Dinosculptures:** On the computer screen, assemble various bones from the **BONES** file to form only part of an imaginary dinosaur. Have the students think about what that dinosaur might look like from the few clues you have given them. Then have them sculpt it in clay or draw it on paper.

- **Spacial Relationships:** Have the students look at the time line that makes up the inside front and back covers of the science reader. Ask them about certain dinosaurs listed there. In what period did they live? How many millions of years ago? What dinosaurs lived in the first quarter of the Age of Dinosaurs? In the first third? In the second half?

Ask the students how big they think T. rex was compared to large animals now? Twice as big as a horse? Three times as big as a giraffe? Half as big as a whale?

- **Labeling:** Open the Story Starter file and then clear the screen. From the Character catalog, pull down several different dinosaurs, plants, or bones, and place them around the screen. Save this screen, then have the students label each object from the words listed in the Label catalog.

Trouble-Shooting Guide

Problem	Possible Cause(s)
Disk will not load	Program Disk not in the drive, or in wrong drive. Disk drive door open. Disk drive improperly connected to computer. Disk inserted upside down.
Cannot Save scene	Scene is locked. A scene with the same name and number already exists on disk. Student Disk not in the correct drive according to the Setup. Disk has a write-protect tab on it. There is no room left on the disk.
Error Message	Too many objects (about 200), or text letters (about 750), or characters (over 11) in the scene. Disk drive door open. Student Disk and Program Disk do not have same story title.
Cannot add new Characters Objects, or Labels	Too many characters, objects or labels in the scene (see above). Pointer is not directly on the character, object, or label when clicking.
Characters will not move	Too many characters and objects in the scene (see above). Character behind another character (only the character on top of a stack will move).

Trouble-Shooting Guide

Problem	Possible Cause(s)
Will not print, or prints incorrectly	Incorrect Setup. Printer not hooked up properly. Paper not centered in the printer.
Pointer does not move	Mouse, joystick, or Koala Pad was plugged in before booting. Mouse, joystick, or Koala Pad incorrectly plugged in (see owner's manual).
Page Turner or Menu Bar won't respond	Scene has been cleared (file must be re-opened). One-page story.
Pointer has disappeared	Pointer has been moved off the screen (Shows as a black line on the border).
Cannot Save Setup	Program Disk has write-protect tab. Program Disk not in drive 1.
All pointers and icons have disappeared	Computer trying to print (they will return momentarily). Print selected without first connecting the printer.

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